SECTION 554
PRECAST CONCRETE PRODUCTS

554.01 DESCRIPTION. This work is the furnishing and installing of reinforced precast concrete bridge members, precast curbs, barrier rails, cattle guard bases, guardrail posts, and other precast concrete products.

554.02 MATERIALS.

554.02.1 Concrete. Furnish portland cement concrete meeting Section 551 requirements.

554.02.2 Reinforcing Steel. Furnish reinforcing steel meeting Section 555 and Subsection 711.01 requirements.

554.02.3 Structural Steel. Furnish Structural steel meeting Subsection 711.02 requirements.

554.03 CONSTRUCTION REQUIREMENTS.

554.03.1 Fabrication Drawings. Submit fabrication drawings and design calculations to the Project Manager for review. Do not begin fabrication until the drawings are returned. The drawings must include the following information:

1. An erection layout with each individual piece identified;
2. The concrete mix design proposed for use in production including proposed admixtures;
3. The size, type, capacity, and location of items incorporated in the member such as chairs, inserts, and other hardware;
4. All other information necessary to fabricate and install the product.

Submit 4 prints of the drawings and calculations initially. After review furnish 3 additional prints of drawings. Furnish prints on 22 X 36-inch paper (A 1 paper) with a 1½-inch (46 mm) margin on the left side and ½-inch (43 mm) margins on the other 3 sides.

554.03.2 Design of Concrete Mixtures. Upon request, the Engineer will furnish a concrete mix design when a specific concrete class is specified. The Contractor may submit a proposed mix design to the Project Manager for approval, in lieu of using the Department-furnished mix design, when concrete is designated by class.

Submit a proposed mix design with the shop drawings to the Project Manager for approval.

The Contractor may request to change aggregate size and gradation to use aggregates in an established plant. Submit the request in writing and include sizes and gradation limits for each size aggregate. Furnish evidence of satisfactory performance of concrete produced from the aggregates. Do not make changes in the aggregates without the Project Manager's approval.

554.03.3 Sampling, Handling, Batching, and Mixing. Sample, handle, batch, and mix materials for concrete under Subsection 551.03.3.

554.03.4 Forms and Forming. Meet the form requirements in Subsection 552.03.4.

554.03.5 Placing Concrete. Place concrete under Subsection 552.03.5.

554.03.6 Curing and Testing Concrete. Cure precast concrete products by water curing, impervious membrane curing, elevated temperature curing, or a combination of these methods.

Perform water curing and impervious membrane curing meeting Subsection 551.03.6 requirements.

Perform Elevated-temperature steam process curing meeting Subsection 553.03.10 requirements.

Submit procedures for curing by the elevated-temperature electric coil process or a combination of methods in writing to the Project Manager for approval before use.

Perform at least 1 test per 50 cubic yards (35 m^3) or per each day's production if less than 50 cubic yards (35 m^3) to verify reaching the compressive strength required to discontinue curing.

A test is the average strengths of 3 cylinders, each cast from different batches of concrete used in the day's production. Take the 3 samples from as many different batches as possible if more than 2 batches are used.

Sample and cast cylinders using MT-101.

Cure until the compressive strength of the standard 6 X 12- inch (152 X 305 mm) cylinders, cured under the same conditions as the concrete represented, reaches the required strength for the class of concrete or the specified strength.

Field-cure cylinders a maximum 28 days and test for compressive strength within 24 hours after removal from the field curing conditions. Perform strength testing under AASHTO T 22. Furnish the Project Manager the certified laboratory test results or arrange for the tests to be witnessed the Department.

Test results are acceptable if the average of the 3 cylinder strengths exceed the strength for the concrete class or the specified strength and no individual cylinder tested has a strength less than 90 percent of the specified strength.

Continue un-interrupted curing until test results are obtained. Should all cylinders be tested without reaching the specified strength, the concrete represented by the cylinders may be rejected.

554.03.7 Cold-Weather Concreting. Furnish concrete at between 60 °F to 90 °F (15 °C to 32 °C) for placing when the air temperature is less than 40 °F (4 °C). Heat the concrete under Subsection 552.03.9(B).

Clear form work of snow, ice, and frost before placing concrete.

Protect the concrete from freezing for at least 48 hours after its placed or until it reaches the strength required to discontinue curing.

After 48 hours, provide freeze protection to develop the required strength.

Construct and protect bridge components meeting Subsection 552.03.9(C) requirements.

Assume all risk of concrete work during cold weather.

554.03.8 Form Removal. Remove lateral support forms only when it will not damage the concrete. Do not interrupt curing and protection in excess of 30 minutes for form removal.

554.03.9 Finish on Exposed Surfaces. Produce concrete surfaces free from rock pockets, depressions, or projections.

Scattered holes from surface trapped air are not considered defects. Point holes larger than ½-inch (13 mm) in any direction with mortar and strike off even with the surface. Apply an ordinary finish to surfaces not smooth and uniform in texture and appearance under Subsection 552.03.12.

554.03.10 Handling, Transporting, and Storage. Do not remove, handle, or transport items designed to carry loads from the casting bed before they reach the required strength.

Other items may be moved from the casting bed to other curing locations when they have reached the strength to prevent damage.

Replace all cracked or broken items at Contractor expense.

Handle, transport, and store precast concrete items without damage. Replace or repair all damaged items at Contractor expense.

554.03.11 Placement. Place precast concrete members as specified.

554.04 METHOD OF MEASUREMENT.

554.04.1 Precast Concrete Curb. Precast concrete curb is measured under Subsection 609.04.

554.04.2 Precast Concrete Median Barrier Rail. Precast concrete median barrier rail is measured under Subsection 606.04.

554.04.3 Plain Reinforced Precast Concrete Bridge Members. Plain reinforced precast concrete bridge members are measured under Subsection 553.04.

554.04.4 Precast Concrete Cattle Guard Bases. Precast concrete cattle guard bases are not measured or paid for separately but are included in the payment for cattle guards under Subsection 611.05.

554.04.5 Precast Concrete Guardrail Posts. Precast concrete guardrail posts are not measured or paid for separately but are included in the payment for metal guardrail under Subsection 606.05.

554.04.6 Other Precast Concrete Products. Other specified precast concrete products are measured and paid for as specified in the Contract.

554.05 BASIS OF PAYMENT. Payment for the completed and accepted quantities is made under the following:

Pay Item	Pay Unit
Precast Concrete Curb	See Subsection 609.05
Precast Concrete Median Barrier Rail	See Subsection 606.05
Precast Concrete Bridge Members	See Subsection 553.05

Payment at the contract unit price is full compensation for all necessary resources to complete the item of work under the Contract.